CLAIMS

We claim:

1. A spray cooling system comprising:

an electronic component with a hotspot zone having a high heat flux;

a spray module having a cavity within, said spray module capable of receiving a supply of liquid coolant;

a spray fin located generally over said hotspot zone and protruding within said cavity of said spray module

said spray module having a nozzle located generally over and in a spaced apart relationship to said spray fin, said nozzle for breaking up said supply of liquid coolant into a droplet pattern that creates a thin evaporative coolant film on a top surface of said spray fin; and

wherein said thin evaporative coolant film is capable of thermally managing said hotspot zone.

2. The spray cooling system of claim 1, wherein said nozzle is an atomizer.

3. The spray cooling system of claim 2, wherein said atomizer is a pressure swirl atomizer.

4. The spray cooling system of claim 1, wherein said top surface of said spray fin includes a surface enhancement.

5. The spray cooling system of claim 1, wherein said supply of liquid coolant is below its saturation temperature prior to entering said nozzle.

6. The spray cooling system of claim 1, wherein said supply of liquid coolant is above its saturation temperature prior to entering said nozzle.

7. The spray cooling system of claim 1, wherein said top surface of said base contains a portion of said supply of liquid coolant that further cools said electronic component.

8. A spray cooling system comprising:

an electronic component with a hotspot having a high heat flux;

a thermal management unit having a base, said base having a bottom surface thermally connected to said electronic component, said thermal management unit capable of receiving a supply of liquid coolant;

a top surface of said base having a spray pin located generally over said hotspot;

said thermal management unit housing a nozzle located generally over said spray pin and for breaking up said supply of liquid coolant into a droplet spray that creates a thin evaporative cooling film on said spray pin; and

wherein said thin evaporative cooling film is capable of thermally managing said hotspot.

9. The spray cooling system of claim 8, wherein said plurality of nozzles are atomizers.

10. The spray cooling system of claim 8, wherein said supply of liquid coolant is below its saturation temperature prior to entering said nozzle.

11. The spray cooling system of claim 8, wherein said supply of liquid coolant is above its saturation temperature prior to entering said nozzle.

12. The spray cooling system of claim 8, wherein said top surface of said base includes a portion of said supply of liquid coolant that further cools said electronic component.

13. A thermal management system for an electronic device being liquid spray cooled, said thermal management system comprising:

a recipient base comprising a front surface having a raised impingement surface, said raised impingement surface orientated to receive an atomized fluid from an atomizer;

wherein said atomized fluid creates a thin evaporative cooling film on a top surface of said raised impingement surface; and

said electronic device having a high heat flux hotspot located in close proximity to said raised impingement surface.

14. The thermal management system of claim 1, wherein said recipient base includes a plurality of grooves.